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EIGHTY-SEVENTH SESSION.

Monday, 22d November 1869.

PROFESSOR KELLAND, Vice-President, in the Chair.

The following Council were elected :—

President.

PROFESSOR CHRISTISON, M.D.

Honorary Vice-President.

HIS GRACE THE DUKE OF ARGYLL.

Vice-Presidents.

Dr LYON PLAYFAIR, C.B.	The Hon. Lord NEAVES.
DAVID MILNE HOME, Esq.	Professor Sir WILLIAM THOMSON.
Professor KELLAND.	WILLIAM FORBES SKENE, Esq., LL.D.

General Secretary—Dr JOHN HUTTON BALFOUR.

Secretaries to the Ordinary Meetings.

Professor TAIT.

Professor TURNER.

Treasurer—DAVID SMITH, Esq.

Curator of Library and Museum—Dr MACLAGAN.

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GEORGE ROBERTSON, Esq., C.E.
Professor PIAZZI SMYTH.

PATRICK DUDGEON, Esq. of Cargen.
Dr HUGH CLEGHORN.
Dr JAMES M'BAIN, Surgeon, R.N.
Dr WILLIAM ROBERTSON.

THOMAS STEVENSON, Esq., C.E.
Dr HANDYSIDE.
ARCHIBALD GEIKIE, Esq.
Professor A. CRUM BROWN.
Principal Sir A. GRANT, Bart.
Rev. Dr W. LINDSAY ALEXANDER.

VOL. VII.

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Monday, 6th December 1869.

The Hon. Lord Neaves, Vice-President, read the following Address:—

I have been deputed by your President to address you to-night from this chair, and so to attempt a task which would have been much better performed by one who possesses all the requisite scientific acquirements which I want, and without which, I fear, justice can only be imperfectly done to the work which I have undertaken.

It is usual at this meeting to give some notice of those of our Members who have died during the preceding year, and the list on this occasion contains so many, and some of them such distinguished names, that it will leave me no space for touching on other topics.

I cannot mention the name of Dr JAMES BEGBIE to an audience like the present without feeling that it recalls to them pleasing remembrances and painful regrets connected with one who was so highly esteemed among us as an eminent physician and an excellent man, and who, but a little while ago, seemed likely for some years to continue his course of usefulness and success.

To myself the subject is specially calculated to communicate such feelings. Dr Begbie was my early school-fellow and friend, and in that relation, and also in my resort to him as a medical attendant in whose anxiety and skill I had the utmost confidence, there were many years, more than half a century, of cordial intercourse between us.

Dr Begbie was born in Edinburgh in October 1789. He was educated at the High School and at the University of Edinburgh, and early betook himself to medical studies. According to the system then established, but now I understand wholly or almost wholly discontinued, he became an apprentice with Dr Abercrombie, and was afterwards his assistant; in which capacity he had excellent opportunities of learning his profession, and of practically applying

his natural talents and theoretical studies. At this period, too, he showed those kindly and amiable qualities for which he was afterwards distinguished, and which gained him the affection both of his principal and of the pupils of Dr Abercrombie, with whom he was brought in contact, and who in a great measure were placed under his guidance and professional instruction. Dr Begbie in his turn became, under the system already noticed, the master of apprentices of his own, who regarded him with the same feelings, and among whom were some of the most esteemed medical men now among us.

Dr Begbie, on relinquishing his connection with Dr Abercrombie, became engaged in an extensive practice as a family medical attendant, and continued in that branch of the profession till about twenty years ago, when he confined himself entirely to the functions of a consulting physician, in which he was eminently successful, his assistance being extensively resorted to both by his brethren in Edinburgh and by practitioners throughout the country, who had confidence in his skill, and in his solicitude to do his duty to the utmost.

It is perhaps a remarkable circumstance that Dr Begbie, although he had hospital experience during his studies, never acted as an Hospital Physician. It is not a little creditable to him that he should have been able otherwise to supply the want of those opportunities from which he was thus excluded, and we should by no means be tempted to recommend a similar experiment in the ordinary case. Dr Begbie, however, was specially enabled to supply any deficiency in this part of his professional career by the very extensive means of observation which were within his reach as the assistant of Dr Abercrombie, for whom, to a great extent, he conducted those post-mortem examinations and pathological inquiries which were so intimately connected with Dr Abercrombie's reputation and success, particularly in certain classes of diseases.

We are inclined to think that in some respects Dr Begbie did not do himself full justice. He worked too hard and perhaps too exclusively at his own profession; he allowed himself scarcely any time for relaxation, although he thoroughly enjoyed the too short intervals which he occasionally employed in this manner. He was

fond of natural scenery, and particularly attached to the English Lake country, and it would have been better if he had indulged his taste more in that direction. We think, too, that in another respect he denied himself some enjoyments which might have done him good. A certain quietness, if not shyness, of disposition seemed to indispose him to much social intercourse, and he seems not to have betaken himself with any degree of interest to extra professional pursuits. We hold that every hard-working man is the better for a considerable amount of social recreation, and for that relaxation which arises from the prosecution of collateral pursuits.

Though not much known as a scientific man beyond the limits of his profession, Dr Begbie distinguished himself, we believe, by several excellent essays, both of a pathological and of a therapeutical kind. We must, of course, on this subject speak entirely from hearsay; but we understand it is generally considered that his volume of "Contributions to Practical Medicine" contains much that is valuable and original. His essays on Fatty Degeneration of the Heart, and on Anæmia and its consequences, have been specially mentioned to me as having excited great attention, and obtained much praise.

In one position which he occupied Dr Begbie was very prominently useful, and deserves to be specially pointed out for general imitation. I refer to the office which for nearly forty years he held as medical adviser to the Scottish Widows' Fund Assurance Office. In saying this, I do not wish to give him any preference over his brethren who, among ourselves, hold similar situations. That would not only be invidious, but utterly unjust; for I know that all the Edinburgh offices, and I have no doubt the Scottish offices generally, are in this respect aided by advisers of the greatest skill, assiduity, and conscientiousness. But the Scottish Widows' Fund is, I believe, our oldest Edinburgh office, and certainly one of our most prosperous, and I cannot resist this opportunity of saying, without disparaging the merits and services of officers of another class in such institutions, that the character and conduct of their medical adviser must always be of the utmost importance to their prosperity. Some recent occurrences have opened our eyes to a danger that we were apt to forget, that those who profess to

give security to others, may not be themselves secure. As the epigram says,

"Payment of premiums will but make you poorer,
Unless you're very sure of your insurer."

And certainly there can be no disappointment more cruel, no injustice more culpable, than that which takes from hard-working men of business a share of their annual earnings on the faith of providing for their families, and then at the end leaves those families unprovided for.

Now, one of the best guarantees for the success and solvency of an insurance office is to be found in the skill and fidelity of the medical officer. It is by testing carefully the value of the lives proposed for insurance that the office is enabled to meet its engagements and realise its profits; for one great source of profit must be that the lives insured are in one sense picked lives, so that they shall not be more hazardous, but rather less so, than the average rate of life on which the tables are framed; and that if any extra hazard is run, it shall be compensated by a corresponding extra payment. The medical duty thus to be discharged is not an easy one, and is beset by many difficulties and snares. It is not always easy to detect the seeds of latent disease, even when the person insured is presented to the medical officer; and it is still more difficult when the judgment is to be formed at second-hand from information that may be careless, inaccurate, or even treacherous, and where the utmost vigilance and acuteness are required in order to detect any concealed flaw. On the other hand, it is not right that lives, even of a doubtful kind, should altogether be excluded from the benefit of insurance, and still less that the medical officer should reject any from ignorance or rashness.

The task thus devolving on Dr Begbie for the important Society to which he was attached was discharged by him in a manner highly satisfactory to his constituents, and tending, there is no doubt, to aid in achieving for that society the great and growing success which has attended it. Dr Begbie's septennial papers on the causes of death in the records of that society were extremely interesting, and, I believe, very instructive. It is a great satisfaction to his friends, and to those interested in that institution,

that his place is now filled by a son who is every way worthy to succeed him.

I shall note here some dates of the principal incidents of Dr Begbie's professional life, and add also from the "Edinburgh Medical Journal" some account of his last illness.

Dr Begbie graduated in medicine in 1821 in the University of Edinburgh. In 1822 he was elected Fellow of the College of Surgeons, and at this time entered on the duties of private medical practice. In 1847, having become much engaged in consulting practice, he joined the College of Physicians as a Fellow. Of that College he was President in 1854-56, and discharged the duties of the office with ability, dignity, and grace. For a few years after the institution of the office, he acted as one of the Examiners in Medicine in the University. During 1850-52 he was President of the Medico-Chirurgical Society. For several years he was Physician in Ordinary to the Queen in Scotland.

The illness which led to his death began in the end of 1868 from exposure to cold, which gave rise to an attack of pneumonia. This was got under, but he returned too soon to his duties, and again became ill from some long journeys which he made. It was then seen that his health was seriously impaired. He suffered much from breathlessness, and the action of the heart became embarrassed. A change of air and scene was tried without success, and on his returning home his symptoms became more violent, and his strength declined. The immediate cause of his death was pulmonary congestion. But he remained conscious and collected to the last, enduring much suffering with great patience, and looking forward to his end without fear and with a well-founded religious confidence. He died on the 26th of August 1869.

WILLIAM BRAND, another of our departed members, was born in 1807, in the parish of Peterhead, and received his early education in that parish. After serving an apprenticeship in Peterhead with the respectable gentlemen who were factors for the Merchant Maiden Hospital of Edinburgh in that place, he came to this city, about the year 1829, and served a second apprenticeship with Messrs Scott, Findlay, and Balderston, W.S., of which firm, after himself entering as a Writer to the Signet, he became a partner.

He was an excellent man of business, of great intelligence, accuracy, and integrity; and his high character in this respect led to his appointment, in 1846, to the secretaryship of the Union Bank of Scotland, a situation which he filled with great usefulness and universal approbation until his death. His knowledge of financial affairs, his readiness to oblige and assist wherever his services were desired, and his great courtesy and frankness, made him most acceptable to his constituents and their customers, as well as to all who came in contact with him.

Mr Brand's love of science early took the direction of a decided taste for botany, and he was one of the original members who founded the Botanical Society of Edinburgh. Of that Society he continued all along to be a most valuable member, contributing many excellent communications to it, and enriching its herbarium with many thousand specimens of interesting plants, collected by him and by his friends in the course of their numerous botanical excursions, on which he always entered with great enthusiasm, and for which he was admirably adapted by his active habits and buoyant spirits, and by his readiness to bear, and even enjoy, the little hardships and inconveniences which such excursions sometimes involve. The spoils with which these excursionists returned were given to the Society, partly for distribution, partly for preservation, and were of no small importance in fostering and diffusing a taste for botany and a knowledge of the Scottish flora.

Some months before his death Mr Brand's health began to fail; and although at first no serious alarm was felt as to his case, he at last sank rapidly and unexpectedly, and died on the 18th October last, having completed his sixty-second year.

Mr Brand was well known as an active member of the Episcopal Church of Scotland. He died deeply lamented by his relatives and friends, and amidst the general respect and regret of the community, for his excellent qualities and exemplary character.

Dr ALLEN DALZELL, an able and amiable member of our Society, was born in 1821 at Madras, where his father held the position of Postmaster-General. Like most children of European parents, he early came to this country and resided with his mother in Dum-

fries, where his preliminary education was mainly carried on. He served for some years, first in the navy and then in the army, and saw a good deal of actual warfare; but in 1846 he resolved to change his profession, and, having commenced with great ardour the study of medicine, he took the degree of Doctor of Medicine at the University here with high distinction. While yet a student he had rendered great assistance to Professor William Gregory in his researches as to creatine and the products obtained from uric acid, and he received from that eminent chemist a special certificate of having exhibited much original research, while he obtained at the same time from the Senatus a remission of one *Annus Medicus* of the usual medical curriculum. In 1853, at the time of his graduation, he obtained the gold medal of the University of Edinburgh for a series of extended researches on physiology, and in December of that year he was appointed by Professor Gregory his class and laboratory assistant, with the duty of teaching the class of Practical Chemistry. During the winter preceding the Professor's death, when he was laid aside by illness, Dr Dalzell supplied his place in the chemical class, and was afterwards appointed by Dr Lyon Playfair, Dr Gregory's successor, to the same duties of conducting the practical laboratory which he had formerly discharged. His connection with the University continued to the last, with these additional labours, that in 1859 he delivered in the New College, Edinburgh, a six months' course on Natural Science, and succeeded the late Dr George Wilson in the Chair of Chemistry and *Materia Medica* in the Royal Veterinary College, which office he filled for many years with credit to himself and benefit to his pupils. He was also in much request, and much esteemed as a popular lecturer on scientific subjects in various institutions in England as well as in Scotland. He was possessed of decided talents, and, with much professional information, he had great refinement and elevation of character; and his frank, affectionate, and generous disposition secured the attachment of all who knew him. With his quick feelings and impulsive disposition, it is possible that his health, already affected by over-work, may have been further injured by an unpleasant lawsuit in connection with his official position in the Veterinary College. An erroneous verdict was returned against him, but which, on

an appeal to the Court, was set aside, and a verdict in his favour unanimously given by a second jury.

His health was for some time delicate, and it was found that he had severe disease of the heart. He died on the 29th July 1869, after an illness of much suffering, borne with pious and exemplary patience. His removal, thus occurring in the prime of life, was felt as a great loss and a severe affliction by his relatives and friends.

Dr ROBERT DYCE was the eldest son of the late Dr William Dyce, an eminent physician in Aberdeen. He was born in November 1798, and was the eldest of a family of sixteen, of whom the late eminent artist, Mr William Dyce, was one. He took his degree of M.A. at Marischal College in 1816, and afterwards studied medicine at Aberdeen, Edinburgh, and London. After being for some time attached to the Military Hospital at Chatham, he went out, in 1821, on a staff appointment to the Mauritius. There he became extremely popular with the English residents, from whom he declined to take fees for medical attendance, but who eagerly showed their gratitude by valuable presents. He was afterwards transferred to the Cape, where he remained for five years, and married the daughter of a gentleman holding a high official position there. He returned to England in 1833, and spent a winter in Aberdeen, after which he accepted a staff appointment at Maidstone; but in 1836, on the death of his father, he was induced to settle in his native town, where he succeeded to an extensive practice and to valuable appointments. In 1860, on the union of the two Colleges at Aberdeen into one University, he was appointed to the Professorship of Midwifery, then established, having previously held a college lectureship on that branch of science for nearly twenty years.

Both as a lecturer and as a practitioner in his special department he was looked up to as a high authority; and to his students, as well as to all who came in contact with him, he recommended himself by his kind and courteous manners, and his high principles and honourable feelings, which were in every respect those of a thorough gentleman. His medical assistance to the poor was given gratuitously, with unremitting and unostentatious liberality. He was an accomplished man, well acquainted with several import-

ant branches of natural history, which he had had peculiar opportunities of studying at the Mauritius and at the Cape; and he had made extensive collections of specimens, some of which were of great value. Though not an artist, like his distinguished brother, he had a great love of art, and a fine and critical taste in painting.

He had been ailing for some little time before his death, but had not felt any serious alarm about his case. At last, however, he came to Edinburgh for medical advice, when it was found that he had acute inflammation of the lungs. It was hoped that it might easily be subdued; but the disease suddenly took an unfavourable turn, and he died in Edinburgh, 11th January 1869, in his seventy-first year.

Among our Honorary Members whom we have lost I have to notice the eminent physiologist M. FLOURENS, lately deceased. He is well known among us, both by his reputation and by his works; and notices of the principal events of his life are to be found in the usual books of contemporary biography. I am sorry that I have been unable to ascertain any particulars as to the cause or circumstances of his death, a matter which, in his case, and in connection with his own speculations, might be thought to possess a special interest.

He was born in the district of Hérault, in France, in 1794, and early devoted himself to medical science, and particularly to physiology and biology. He made various researches and experiments on the nervous system, and on the several functions of the great sources of nervous power; and his countrymen consider that the disclosures thus made by him, preceding, as they did, the promulgation of the discoveries of Sir Charles Bell, entitle him to high praise, and form the best foundation of his scientific reputation. He published a variety of works on other cognate subjects from time to time, one of the most remarkable of these being upon "Longevity, and the amount of life diffused over the globe," in which he vindicated for man the period of 100 years as the normal duration of his existence under favourable circumstances. He was elected a member of the Academy of Sciences, of which he afterwards became one of the secretaries. He was also afterwards elected a member of the Académie Française, and had numerous other honours conferred upon him, both scientific and

political. But he seems to have valued his scientific position above all adventitious dignities. At his death he had attained his seventy-fifth year, which might be generally thought a pretty fair allowance of life; but from our ignorance of facts above alluded to, we are unable to say whether this, in his view, a *premature* termination of his existence, is or is not a confirmation of his own theory on the subject.

There is no member of the Royal Society of whom we have occasion to lament the death, and to cherish the memory, more than Principal FORBES, who was for so long a period our faithful and efficient Secretary. It will not be easy to do justice to the merits of one who had so many claims upon our gratitude and regard, and who reflected so much honour on every public institution with which he was connected.

James David Forbes was born at Edinburgh, on the 20th of April 1809, and was the son of Sir William Forbes, of Pitsligo, Bart. The death of his mother in the year after his birth, and the delicacy of constitution which proved fatal to her, made his father feel anxious about the boy's health; and as he grew up, his slender frame, and almost premature intellectual development, seemed to indicate that his education should be conducted with caution, and limited, in the first instance, to the simplest and most essential subjects. It is remarkable, that it was thought necessary, on this ground, to prohibit strictly his study of mathematics; and it was only at spare moments, and almost by stealth, that he acquired a branch of knowledge so intimately connected with the pursuits in which he was afterwards destined to excel. His preliminary education was chiefly domestic, but in due time he attended several of the classes of the Edinburgh University. On leaving it, he has told us that geology, meteorology, and physics were his favourite pursuits; and he then began those excursions at home and abroad which were to him all his life so great a source of pleasure and scientific improvement. While he was still a youth his father had occasion to spend two successive winters in Italy, whither he took his son with him; and young Forbes's natural taste for investigation led him to make frequent visits to Vesuvius and the celebrated Pillars of Serapis. His mind was strongly moved by what he

there saw; and in 1827, when eighteen years of age, his first scientific papers appeared in Dr Brewster's Journal, but without his name. Two other papers from him, on the natural features of the same region, appeared in the same journal, also anonymously, but with the signature "Delta;" and from that time forward he continued to be a regular contributor to that publication in communications which were avowed.

In 1830, in compliance with his father's wishes, Mr Forbes passed advocate at the Scottish bar, and walked the boards for a short time; but his heart was not there, and it would have been vain to confine his buoyant spirit and active frame to the close discipline of that profession, when it was in his power to indulge his tastes and faculties in the pursuit of physical science and geological exploration. He soon afterwards resolved to quit the law, and rejoiced in the change he had thus made. At this time he visited Switzerland, and imbibed that interest in the subject of the glacier formations which afterwards stimulated so much of his exertions, both as an explorer and as a scientific author.

In 1833, on returning from the Continent, he found that the Chair of Natural Philosophy had become vacant by the death of Professor Leslie, and that Forbes's friends had put him in nomination as a candidate. It was a painful position for him to occupy when his competitor was Sir David, then Dr Brewster, who had been among his earliest scientific friends, and who had fostered and encouraged his talents by the kindest sympathy and assistance. It was a keen contest, and the friends of Brewster might naturally feel indignant that so young a man should be preferred to one of such high eminence and long standing as Brewster had attained to. This preference was imputed entirely to political feeling or local influence, and these undoubtedly entered largely into the question. But the supporters of Forbes were no false prophets when they predicted for their candidate a long career of ardent exertion and eminent success, not only as a scientific inquirer, but as a lecturer and teacher; and as to his youth, it was pointed out that Maclaurin, Dugald Stewart, and other eminent professors, were appointed at as early an age, or earlier. The appointment, ultimately, had all the justification which the event could supply. Professor Forbes occupied the Chair of Natural Philosophy for more than a quarter

of a century, with the utmost honour to himself and the University to which he belonged. It is creditable to both parties, and more especially so to Sir David Brewster, that the contest which thus terminated did not dissolve their friendship, or prevent their cordial co-operation in everything that could promote the interests of science.

For a long series of summers Professor Forbes resorted to Switzerland and to other districts of alpine scenery in Europe, and thus matured those profound and important views which he promulgated on geological and other questions—in particular, on the subject of glaciers. It is quite unnecessary, and would be very presumptuous on my part, to attempt any account or criticism of his works or researches, and indeed everything that could be desired has in this respect, so far as geology is concerned, been excellently done by our friend Mr Geikie, in the minute and kindly memoir of Principal Forbes which he lately read to the Geological Society. Appended to that memoir will be found a correct and complete list, as I believe, of Principal Forbes' scientific writings, and the catalogue of our own library will supply similar information. I may shortly say, that Principal Forbes was an ardent geologist—that from an early period he had been imbued with the enthusiasm for that branch of science which prevailed among scientific men in Edinburgh in the first quarter of the present century, and that he earnestly desired to see a school of geology fully revived and established among us.

Principal Forbes, it is somewhat singular to observe, had on the motion of Dr Brewster been admitted a member of the Royal Society before he had attained his twenty-first year. The Keith Prize was twice awarded to him by the Council. In 1846, on the death of Sir John Robison, he was appointed to the office of Secretary of this Society, and for about twenty years thereafter he discharged the duties of the appointment with the most efficient assiduity and the most conscientious diligence. His desire to maintain the usefulness and the dignity of the Society, and to preserve its ranks and its discussions free from anything that was unworthy of a scientific body, and the pains that he took in procuring and preparing for publication the compositions which constitute its "Transactions," and on which its character and reputation will in a great measure permanently depend, were beyond all

praise, and were both proved and rewarded by the condition in which he maintained the Society while he was Secretary, and in which he left it when he resigned that office.

On occasion of his giving up the office of Secretary, the Royal Society recorded the expression of their sense of his valuable services in the following resolution :—"That the Royal Society deeply laments that a necessity has arisen for the retirement of Principal Forbes from office as General Secretary. That it desires now to record in its minutes its grateful sense of the obligation under which it lies to Principal Forbes for the zeal and ability with which he has acted as its Secretary for the last twenty years, for the many important discoveries and inquiries in science which he has brought before its meetings, and for the eminent degree in which his exertions and example have contributed to its present prosperity; and that, as a mark of the regard in which he has been long held, alike as an office-bearer and as a cultivator of physical science, he be requested to sit to an eminent artist for his portrait, to be hung in the Society's apartments."

On the removal of Sir David Brewster to the headship of the University of Edinburgh, Professor Forbes was chosen Principal of the United College of St Salvator and St Leonard in the University of St Andrews. His failing health, which, there can be little doubt, had suffered much from excessive exertions in his mountain excursions, and perhaps also from overstrained labour in some of his scientific researches, made the retreat thus offered to him a welcome refuge from the task of daily lectures to which he had become quite unequal. For a time after his removal to the retirement of St Andrews, he seemed to be rallying in strength, with the assistance of his annual residence in the pure air and amidst the interesting scenery of Perthshire, but the improvement did not continue, and his old ailment of hæmorrhage from the lungs returned with alarming violence. He left St Andrews and removed to a milder climate, stopping ultimately at Clifton, where he died on the 31st of December 1868. We are told that "whilst his body was reduced to the last stage of weakness, his mind remained self-controlled, unclouded, and peaceful to the end." His activity and usefulness in his office of Principal of St Andrews University have been borne witness to, and a truthful and touching tribute paid to

his memory, in the address lately delivered by his excellent and accomplished successor Principal Shairp.

Principal Forbes had a certain reserve and apparent dryness of manner, but he had a kind and noble heart, an unremitting zeal for the promotion of science, a conscientious desire to discharge every duty, an ardent love of truth, and a strong detestation of injustice. He was not unmindful of what he felt to be his own claims, but he also fought many a battle in vindication of what he considered to be due to others.

The late Master of the Mint will be readily enrolled by all who knew him, or who know what he has done, as another among the great names that Scotland can boast of in chemical science.

THOMAS GRAHAM was born at Glasgow, on the 21st December 1805, and after passing through the usual course of preliminary study in that city, he entered the University of Glasgow in 1819. He early showed a strong taste for science, and a decided bias for chemistry as a pursuit. His father, it is believed, wished him to enter the Scotch Church; but Graham felt that his true vocation lay in another direction, and his desire of penetrating the secrets of natural knowledge was too strong to be repressed. Thomas Thomson was then Professor of Chemistry in Glasgow University, and it cannot be doubted that from his instruction Graham derived great benefit, and received a strong confirmation of his natural tastes in that direction. After graduating at Glasgow, he repaired to Edinburgh, and studied for two years under Dr Hope, who, if not distinguished by powers of original discovery, was an able and elegant expositor of the discoveries of others, and most successful in conducting the experiments by which his lectures were illustrated. Graham at this time also made the acquaintance of Professor Leslie, a man of undoubted originality and of most diversified knowledge, and with whom it was impossible to associate without being stimulated to intellectual exertion and scientific inquiry.

It is probable that, during the time when he was engaged in his University studies, both in Glasgow and Edinburgh, he was subjected to much anxiety as to his prospects, and as to the probability of his being able to justify, by success, the choice which he had made of a position in life, which could scarcely be said to

amount to a profession, and which, at that time in particular, promised few and scanty rewards for the efforts and sacrifices which it involved. In these trials it would appear that Graham was comforted and supported by the sympathy and affection of an excellent mother, with whom, when he was absent, he regularly corresponded, and to whom he confided his most intimate and anxious feelings.

In such circumstances, it must have been a source of pride and satisfaction to him that, in 1829, when scarcely twenty-four years of age, he was appointed Lecturer on Chemistry at the Mechanics' Institution, Glasgow, and in 1830 Professor of Chemistry at the Andersonian Institution, an event of which his mother just survived to hear.

In 1837 he was appointed Professor of Chemistry in the London University, and remained in that appointment till the year 1855. During the five and twenty years for which he thus occupied a professorial chair, first in Glasgow and then in London, Graham found himself in that position which was the one he would himself probably have selected as the best for carrying on his favourite plans of scientific investigation; and that long period was accordingly devoted to the assiduous prosecution of his great object, in the course of which his enthusiastic researches were rewarded by numerous important discoveries, which are not only in themselves valuable, but which must ever deserve the attention of chemical students, as examples of that assiduous application and persevering inquiry by which alone the hidden truths of nature can be brought to light.

It is quite beyond my power to give any detailed account of Mr Graham's discoveries, or to make a just estimate of their value in a science with which, in its rapidly advancing and ever expanding state, I am so imperfectly acquainted; but I believe the statements on the subject which lately appeared in the new periodical, "Nature," may be relied on as accurate and just; and I have been furnished from a high authority with some materials as to these points, which I shall endeavour here to embody to the best of my ability.

Graham's tendency to the prosecution of scientific discovery showed itself while he was yet a pupil of Professor Thomson in Glasgow. He made some suggestions to that Professor as to

the possibility of water playing an important part in the constitution of acids and salts. The Professor was struck by the ideas of his young pupil, and encouraged him to continue his investigations on the subject. This ultimately led to his splendid researches in phosphoric acid, as to which he shows that its three varieties—common phosphoric acid, pyrophosphoric acid, and metaphosphoric acid—differed only by containing a different number of atoms of water, chemically combined with the an-hydride. He followed this inquiry up by researches on water in salts, and showed that in a salt the different numbers are held with different degrees of tenacity. His attention was early attracted to the diffusion of gases. The manner in which gases mix with each other, and the permanence with which the intermixture is maintained, are remarkably different from what is experienced in the case of liquids; and it is probably to this fact that we owe the stability of the proportions in which the ingredients of the atmosphere are maintained, a uniformity which is so essential to organic life. The laws also according to which gaseous diffusion takes place were found by Graham to be based upon mathematical relations between their density and their velocity of diffusion, which were at once interesting and unexpected. The laws as to the effusion of gases into a vacuum, and their transpiration through narrow tubes, were also traced by him with indefatigable diligence and complete success; and it is a fact of which we may be proud, that his first paper on that subject was read before this Society. The importance of these investigations, particularly in connection with the phenomena of osmosis, will probably be seen, in its full extent, in the clue which they seem to give to some of the most remarkable facts in physiology. The discoveries of Dr Graham were due mainly, it may be said, to his close adherence to any subject on which he once entered. He never quitted it until, by steadfast attention, deliberate consideration, and varied experiment, he had extracted out of it every atom of scientific truth which it was capable of yielding. The secret of his success in this respect was probably not different from what may be seen in other eminent discoverers. Newton ascribed his achievements not to genius, but to earnest and unremitting attention; and it must be manifest how much more likely it is that a

new truth should dawn upon the mind which has been long and intently occupied with a subject than that it should be the fruit of a casual and transient consideration. It was by this habit and faculty of perseverance that Graham was enabled to do what he did; it was to this that we owe all that he has taught us as to the diffusion of gases and liquids, as well as his last and crowning discovery as to the nature of hydrogen, of which, perhaps, the full effect is not yet fully seen or recognised.

At an early stage of his inquiries as to hydrogen, he had seen that it was isomeric with some of the metals, but his later experiments went further still towards establishing the metallic character of that gas. He showed that certain metals—palladium, platinum, and iron—can, under certain circumstances, absorb considerable quantities of hydrogen gas. This he termed the “Occlusion of Hydrogen Gas.” Latterly, his investigations were made almost exclusively with palladium, which absorbs a much larger proportion of hydrogen than any other metal. The method he pursued was to decompose water by a galvanic battery, the negative electrode, at which the hydrogen is liberated, being formed of a plate or wire of palladium. In this arrangement, when the decomposition takes place, oxygen is given off copiously at the positive electrode, but no hydrogen, or very little, appears at the negative in the first instance, the avidity of the palladium for oxygen requiring that it should first be saturated with that substance, after which the hydrogen begins to be given off. In this way Graham succeeded in charging palladium with a quantity of hydrogen, which, in the form of gas, would occupy 900 times the volume of palladium. The palladium so charged retains its metallic appearance, and differs from pure palladium, very much as a metal containing a small quantity of metallic alloy differs from the pure metal. From these facts, Graham inferred that hydrogen in its solid state was truly metallic, and to this substance, according to the usual analysis of chemical nomenclature, the name of hydrogenium was given, and a medal of palladium and hydrogenium in the alloyed state was struck in honour of the discovery. Another of his recent discoveries is said to have been that, while the gas shut up in terrestrial iron is carbonic oxide, the gas contained in meteoric iron is hydrogen.

Prior, I believe, to the year 1850 the Mastership of the Mint had for a long time been a political office, the occupant of which was removable with the ministry with whom he was associated. The individual who held it was, in this way, not a man of science, but a statesman of general intelligence and business habits, whose duty it was to superintend and keep to their tasks the permanent officials by whom the work was understood and performed. In 1850 a change was made in this respect, and apparently a change for the better. It was determined that the office should be held by a man of science, not connected or removable with the ministry of the day, but who should give his talents and time to the actual working of the department. The office, as thus remodelled, was conferred upon Sir John Herschel, in acknowledgment of the high eminence which he had attained in so many branches of science. He held the office till 1855, when he resigned it from bad health, and Dr Graham was then appointed. He continued to hold the office and discharge its duties till his death with the utmost diligence and efficiency.*

All who knew Graham concur in bearing testimony to the purity and simplicity of his nature, and to the justice, generosity, and kindness of his conduct. He was physically too weak, and perhaps too much engrossed with scientific objects, to enter much into society; and he had no ambition for display, but was solely bent upon the discovery of scientific truth for its own sake, and for the advancement of scientific objects. He has been cut off in the midst of a noble and useful career, when it might have been hoped that some years of active investigation would still be allowed him, and from which it is not easy to estimate what results might have followed. The loss which science has thus sustained can only be repaired by similar exertions made in a similar spirit by those who possess the natural qualifications that are essential to scientific inquiry.

Dr Graham, for some time previous to his last illness, had occasionally gone to Malvern for a day or two at the end of a week, and derived much benefit from the change. On the last

* If any further change be contemplated in this department, it is to be hoped that it will not tend to deprive men of science of what is at once a fair reward and a fitting sphere of usefulness.

occasion, however, of his being there, he had over-fatigued himself by walking, and caught a chill from falling asleep near an open window. The result was an attack of inflammation in one of the lungs. He returned immediately to London, where his medical advisers from the first took an unfavourable view of his case, either in its immediate or ulterior consequences. He died on 16th September, after ten days' illness, having been assiduously attended by his sister and one of his nieces. His remains were brought to Glasgow, and interred in the family burying-ground attached to the Cathedral, where two months before he had erected a tombstone to the memory of his parents and other members of the family, space being left merely for his own name and that of his only surviving sister.

CHARLES FREDERICK PHILIP VON MARTIUS, the greatest, perhaps, and most celebrated botanist of the present day, was born at Erlangen, in Bavaria, in the year 1794. His family are said to have been of Italian origin, but they had been for some time settled in Bavaria, where his father had a medical appointment in connection with the court. Young Martius received, in the first instance, the usual medical education, but when about eighteen years of age resolved to devote himself to botany, and shortly afterwards was appointed to a subordinate position in the Botanic Garden at Munich. His diligence in that situation, and the merit of some treatises which he then published, attracted the notice of Maximilian Joseph I., who was an ardent lover of plants, and a frequent visitor to the garden. In 1816, when the joint expedition was concerted by Austria and Bavaria to explore the natural history of Brazil, Martius was named by the king as the Bavarian botanist, though then little more than twenty-two years of age. He immediately set out on this enterprise, and was absent for a period of four years, having returned to Munich on the 8th of December 1820. The explorations made by the two Bavarian travellers, Spix and Martius, who proceeded in a separate direction, and over a wider field than their Austrian associates, were on a scale much larger and more comprehensive than any that had previously been attempted. The expedition, we are told, irrespective of the sea voyage, extended over nearly 1400 geographical miles, and for months led through the

most inhospitable and dangerous regions of the New World. Both explorers, however, escaped without any important disaster on the road, and they had the rare good fortune to preserve and bring home their collections, complete and uninjured, through all the perils to which they were exposed. These collections, finer and richer than all previous and most subsequent ones from Brazil, were made over to the Academy.

The task thus successfully achieved established Martius's reputation, and settled for life the special destination of his studies. He received from his sovereign distinguished honours, and was recognised by men of science as worthy of a high place among them. The publication of the narrative of this Brazilian journey, which appeared in 1823-31, and which, in consequence of the early death of Spix, was chiefly prepared by Martius, carried the admiration of his talents to a very high pitch. There was here seen a worthy rival of Alexander Humboldt; and readers were at a loss whether to admire most the copiousness of the information furnished, or the beauty of the diction, and the poetical and yet truthful power of the colouring, in which were presented all the characteristic features of those wonderful regions, with their productions and their inhabitants. A relative work at the same time was commenced, and continued in a magnificent series of volumes, exhibiting to scientific eyes the minute representation and description of the natural objects, whether plants or animals, with which the expedition had made the travellers familiar. The esteem in which these works were held procured for Martius the distinguished honour of being elected a member of the French Institute. He was enrolled in nearly all the other learned bodies in Europe; he was appointed an Honorary Member of our own Society in the year 1855.

After the accession of Louis I. to the Bavarian throne, Martius was appointed Professor of Botany in the University of Munich, and subsequently was promoted to be Chief Conservator of the Botanic Garden.

In 1823, Martius began his celebrated Monograph upon Palms, which was completed in three folio volumes in 1845. It is considered one of the finest monuments of modern botany, and is said to contain a description of 582 different species of Palm, while Linnaeus had only given 15, and Humboldt 99. It was to

this work that his friends specially alluded when, in 1864, on the jubilee of his graduation at the Academy, a medal was struck in his honour, dedicated "PALMARUM PATRI," with the motto "TU PALMIS RESURGES;" and the same idea was followed when, four years afterwards, on 13th December 1868, his bier was bedecked with palm leaves, and a similar motto inscribed on his tomb.

The last great work in which Martius was engaged is the "Flora Brasiliensis," which was continued, from time to time, upon a scale worthy of the subject, and at his death had reached its forty-sixth part. It is to be hoped that it will be continued in the same spirit in which it was begun.

Martius was a most popular lecturer, and in every way a superior man. His general intellectual powers were very great, and his readiness to communicate his knowledge was unfailing. His hospitality was liberal, and his best recreation, after the labours of each day, was the reception in his house of scholars, travellers, and men of science, and more especially of young inquirers after knowledge, whose projects and aspirations he delighted to encourage and direct. He died in his seventy-fifth year; but I regret that I am unable to state any particulars as to that event, or his last illness.

Among those members whom we have this year lost by death is the late venerable and excellent pastor of St Stephen's Church, in this city. He took no prominent part as a man of science, but he felt an interest in its progress, and watched its rapid advance; and though not mixing actively in the proceedings or debates of this Society, he strongly approved of its objects and recognised its benefits. It is an honour to have such men enrolled among us, and when they are removed in the course of nature, they should not be deprived of the just tribute to which their virtues and talents are entitled.

Dr WILLIAM MUIR was a native of Glasgow, the son of a Glasgow merchant. He was a distinguished student at Glasgow University, and having chosen the Church for his profession, he was ordained in the year 1812. It is said that his own predilection originally was for the Church of England, and that he entered the Scotch Church in deference to his father's wish. However this may be, the choice then made by him was fully ratified by his ultimate convictions.

He was first assistant, and afterwards minister, of St George's, Glasgow, and was about the year 1822 removed to the New Greyfriars' Church, Edinburgh. On the erection of the parish of St Stephen's in 1828, he was appointed to that charge, which he continued to hold till his death on 23d June last.

In every situation in which Dr Muir was placed as a minister he discharged his parochial duties in the most exemplary and efficient manner; in particular in St Stephen's parish, of which he was the pastor for forty years, not only his ministrations in the pulpit, but his diligence in personal attention to his flock, his care of the young, his kindness to the sick and suffering, and his organisation for the promotion of education, and the diffusion of sound Christian faith and active Christian practice, were such as to call forth the strongest feelings of gratitude and admiration in his congregation and parishioners. His elders, embracing among them some of the most eminent and respectable of our citizens, concurred in looking upon his pastoral services as invaluable, and omitted no opportunity of testifying their confidence in his character and their sense of his worth. Documents have been placed in my hands, by some of their number, which enable me to make these statements with a perfect conviction that they are in no respect exaggerated, and that Dr Muir was, in all his parochial relations, the model of a Christian minister. I have read with peculiar interest the proceedings of his congregation in 1862, when, on occasion of his completing the fiftieth year of his ministry, they placed at his disposal the fruits of a liberal subscription among them, but which he declined to receive personally, and insisted on forming into a sinking fund, of which the proceeds were to be annually applied to pious and charitable uses, parochial or congregational. I have also read, with a perfect persuasion of its sincerity and truth, the address which the late excellent Dr Hunter delivered in 1864, on occasion of Dr Muir being compelled to withdraw from active duty in consequence of a failure of eye-sight, with which he was visited. That address was obviously from the heart of the speaker, as it must have gone to the hearts of those who heard him, and bears unequivocal testimony to the high character of the man who was the subject of it.

This is not the place to speak of Dr Muir's career or opinions,

either on religious or on ecclesiastical questions. I may venture, however, to make one or two observations in connection with these matters.

1. Dr Muir, from an early period of his ministrations, came to occupy a somewhat peculiar position as a minister. He belonged to what was called the Moderate party in the Church, having no sympathy with the strong views either of popular rights or of spiritual independence, which characterised the High Church Presbyterians. But the Moderate party had also the reputation, whether well or ill founded, of being rather *too moderate* in their doctrinal views; and, in this respect, Dr Muir's opinions and style of preaching were more decidedly and prominently evangelical, as it was called, than was generally the case with his political friends.

2. Dr Muir's opinions were always listened to in the Church Courts with respect and deference; but he was not altogether adapted to the position of a party leader, which, in other respects, he might have well attained. He had a fault, or what will be considered such by some men; but it was that fault which a delightful poet has ascribed to the greatest man of his own age—he was

“ Too fond of the *right* to pursue the *expedient*.”

It has been well observed to me, by one who knew him well, that it is a rare thing, and anything but a disparagement, when all that can be said against a man is, that he followed conscience exclusively, and valued integrity and independence too high for any price to tempt him even to the semblance of a surrender.

Perhaps his most marked characteristic was this high-minded conscientiousness of disposition. His habit of making conscience of everything made him appear stiff and unbending to those from whom he differed in opinion, and many may think that he took the alarm too soon and too sensitively when he thought that even the outworks of principle were in danger. His steadfastness certainly to what he held the truth never quailed; his independence was unshaken by what to others might even seem legitimate feelings. His superiority to all selfish motives had in it the essence of chivalry. Though to strangers his manner was reserved, those who had the privilege of familiar intercourse with him knew that beneath the surface there lay a native geniality of temper which

could break forth and sparkle into its natural gleams, and a heart as warm as ever beat in human bosom.

Dr Muir was an accomplished scholar, and all along kept himself abreast of the literature and science of the day. He was well read in the classics, and had a more than usual acquaintance with the literature of his own profession. Suffering for a year or two before his death under nearly total blindness, he had a reader always with him, to read to him his favourite authors, not in English merely, but in Latin and Greek, and even Hebrew.

Dr FREDERICK PENNEY, Professor of Chemistry in Anderson's Institution, Glasgow, was born in London in 1817. He was brought up as a professional chemist, having early shown a predilection for that branch of science. He studied under Mr Hennel of London; and it has been stated that he was present when his instructor was killed, while conducting some experiments, by an explosion of fulminating powder. Dr Penney recommended himself very early by important experiments and communications on chemical subjects; and in 1839, while only twenty-two years of age, when the Chair of Chemistry, which he ultimately held, became vacant, he was recommended for the office by the late Professor Graham, and unanimously appointed by the patrons. Dr Penney was a man of great talent, quickness, and intelligence, and an excellent chemist, both theoretical and practical. As a chemical analyst, he enjoyed a high reputation for his fidelity and accuracy, and, I should suppose, must have derived a considerable income from that source. In one department, that of a scientific witness, I can bear personal testimony to his ability and excellence. His evidence in the witness-box was always clear, ready, explicit, and consistent; and he had one qualification essential to every good scientific witness, but which is certainly not possessed by all who place themselves in that position,—he underwent the operation of cross-examination with perfect composure and good temper, and showed himself as ready to speak to any fact that seemed to bear against the side adducing him as he had been to give evidence in its favour. This demeanour, which every scientific witness should at least assume, made his testimony very influential and valuable. In his private relations, Dr Penney appears to have

been an amiable and agreeable man, with strong feelings of affection to his friends, and much kindly consideration for the feelings of others. He was well informed and highly accomplished. He was fond of travelling when he could command a holiday, and his skill as an amateur artist enabled him the better to enjoy and perpetuate the beauties of the scenery which he visited.

His frame was never robust, and for some time past he suffered from a complication of ailments, which terminated his life on the 2d November 1869, at the age of fifty-two.

His funeral was attended by many scientific friends and respectable citizens of Glasgow, as well as by the chief office-bearers of Anderson's Institution, and the students of that seminary joined the procession and proceeded with it to the burying-ground.

Dr WILLIAM SELLER, an eminent member of the medical profession, and long an esteemed Fellow of this Society, was born in Peterhead, Aberdeenshire, in 1798, the son of a respectable merchant, who died while his family were children, leaving them under the charge of a widow, who was herself still young, and who found that, in consequence of losses arising from misplaced confidence in others, she must depend on her own exertions for the family's support. She came to Edinburgh as a better field, both for earning a livelihood and educating her children, and here her son William had the advantage of the excellent education which the High School and the University afforded. He was distinguished at both of these seminaries, and latterly was enabled to assist his mother by his creditable exertions in private tuition.

He became at the University a member of the Dialectic Society, where he formed many pleasing and permanent friendships with several of his contemporaries, including, among others, Lord Deas, Dr Aitkēn, for many years the Minister of Minto, and Dr Cumming, Government Inspector of Free Church schools. With these gentlemen he maintained a life-long friendship, as well as with many of those whom he had attended as private tutor, and who had learned to respect his learning and his virtues. Ultimately he made choice of medicine as his profession, and took the degree of M.D. in August 1821.

Prudential considerations led him soon afterwards to make his

knowledge and abilities available in a form which generally brings to those who adopt it less honour than its usefulness and its intrinsic merit truly deserve. He opened a house for the reception of medical students as boarders during the College session, and instituted classes for preparing such students for their examination. It is not impossible that the department thus chosen by him formed some impediment to his success as a medical practitioner; but no one who knew Dr Seller, or watched his conduct, could fail to see, both in his choice and in the manner in which he followed it out, proofs of his manly independence, and of his earnest desire to promote medical science and maintain the dignity of his profession. His lectures and lessons, we believe, were admirably adapted for that purpose, delivered in the most kindly and conciliatory tone, and skilfully framed to lead his pupils by easy gradients to the most commanding views of medical knowledge. His general learning and accomplishments were at the same time suited in an eminent degree to illustrate and adorn medical studies. He was an excellent classical scholar; he was profoundly acquainted with the intellectual and moral sciences, for which he had early shown a strong predilection; and he was a proficient in those physical sciences which were most closely connected with his own professional subjects. The extent and accuracy of his information were only equalled by his readiness in communicating it and his modest estimate of his own acquirements.

His last book, which he published in conjunction with Mr Henry Stephens, on "Physiology at the Farm," will illustrate at once, to those who are capable of appreciating it, the extent and variety of his scientific knowledge, and some defects at the same time which attended his mode of conveying instruction in this form.

In that volume there is a marvellous exposition of all the most important facts and principles connected with the subject of animal growth and nutrition, particularly as applicable to the rearing and feeding of stock; and the ground there travelled over in physiology, anatomy, chemistry, and botany is so extensive, that no one who was not thoroughly master of all these subjects could do them the justice which has there been dealt to them. The only fault in his dissertations is that they are too profound, and that it may be necessary to find an interpreter to stand between the man of science

and the practical farmer. From this fountain, however, all instructors desirous of communicating to those concerned a familiar and available view of the truth on these subjects will be able to draw the most important and reliable materials. In the preparation of this book, Mr Stephens, in a pleasing letter addressed to me, bears testimony to the assiduity, readiness, and disinterested zeal of Dr Seller, who declined all remuneration for his labours, though offered from a high quarter, and was with difficulty persuaded to let his own name stand first on the title-page before that of his excellent associate, who in the scientific department of the book felt how great a claim Dr Seller had to the commendations due to the work.

I am not personally acquainted with his other productions, and should be ill qualified to form an estimate of their worth; but a full account of these will be found in the notice of Dr Seller contained in the "Edinburgh Medical Journal" for May 1869. That memoir is, I believe, from the pen of Dr Alexander Wood, who was on the most intimate terms with him, and who has shown his ability both to appreciate and to record the talents and virtues of his friend.

Mention is there made of the great merit of the lectures on Mental Diseases which he annually delivered, under the Morrison Endowment, in the College of Physicians. "We have called them wonderful," Dr Wood says; "they were truly so, whether we have respect to the learning they displayed, to the acuteness and originality of the views which they enforced, or to the power of mental analysis which they exhibited. But," he adds, "if ever published, they will require some gifted and loving hand to popularise the style, and let the whole matter down to the comprehension of the busy workers of our every-day world."

The same memoir contains a full account of the professional honours which he attained. Among the most distinguished of these was his appointment as President of the Royal College of Physicians from 1848 to 1850. He was also the librarian of that College and a councillor for twenty years. A few years ago they did him the honour to request him to sit for his portrait, to be hung in the new hall, and the picture thus painted was among the last works of the late Sir John Watson Gordon. Dr Wood thus speaks of his personal character with equal kindness and truth:—

"His moral qualities reached almost higher than his intellectual, and were the secret of the influence he possessed, and of the affection with which he was regarded. His courtesy of manner and delicacy of feeling marked him as a true gentleman in all that he did. In him sterling integrity, firmness of principle, unswerving rectitude, and thorough persuasion in his own mind, were combined with a breadth of view, and a tolerance for the opinions, ay, even for the weaknesses, of others, as pleasing as it is rare. Guileless as a child, he was yet sagacious beyond most men; while the delicate susceptibilities of his kind heart prevented him from saying or doing anything that could by possibility wound the feelings of another."

In society Dr Seller's manners were most genial and agreeable, and he had the power of attaching to himself all who made his acquaintance. Mr Stephens, his "collaborateur" in the "Physiology of the Farm," and who came to know him only through their union in that work, writes to me of him—"I never made so dear a friend on so short a notice."

Until about the year 1865 Dr Seller enjoyed a fair amount of good health, and retained his active habits; but shortly after that time his constitution gave way; and when, after some interval, he sought medical advice, a complication of disorders was discovered to exist, including disease of the heart.

Under the care of Mr Archibald W. Dickson, assisted by other eminent medical friends, the worst symptoms were kept in check for a time, but at last resisted the remedies applied to them, and made it apparent that his end was approaching. He bore the sufferings incident to his illness with the fortitude of a philosopher and the resignation of a Christian. He discussed with his medical attendants every symptom of his malady, and its probable termination, with the same calmness as if the patient had been a stranger. He retained his courtesy and kindness to all around him to the very last. His death occurred on the 11th April 1869, at the age of seventy-one. The great respect with which he was regarded was shown by the number of those who, unbidden, were present at his funeral. The College of Physicians, who had long considered him an honour to their body, attended in their official robes, preceding the coffin to the grave, and surrounding it while the last rites were

performed. It will be long before we see supplied the place of one who had so many high attainments and so amiable a character —so many solid and so many agreeable qualities.

JAMES WARDROP, one of our oldest members, and long known as a very eminent surgeon, was born, in August 1782, at Torbanehill, a small property which had been long in his family, and which has since earned a marked reputation in a mineral and chemical as well as a forensic point of view. He commenced the study of medicine under the care of his uncle, Dr Andrew Wardrop, an eminent surgeon in Edinburgh. He became assistant to Dr Barclay, the celebrated anatomist, and was for some time house-surgeon in the Royal Infirmary here. He afterwards went to London, to prosecute his studies in the lecture-rooms and hospitals of the metropolis; and afterwards passed over to Paris, though by this time the peace of Amiens had been broken off, and war had recommenced between France and England. Had he been known as an Englishman, he would have been detained as a prisoner; but he contrived to elude the vigilance of the police whilst he remained in Paris, and ultimately succeeded in effecting his transit from France into Germany. He attended various lectures at Vienna, and had there his attention specially directed to the diseases of the eye, for the treatment of which he afterwards attained so high a reputation. On returning to Edinburgh, he commenced the practice of his profession, and very soon selected surgery as his department. After practising here for four or five years, Mr Wardrop left Edinburgh, and settled in London as a surgeon. Instead of attending, however, the public hospitals there established, he preferred to institute a surgical hospital of his own, the wards of which were thrown open to the profession gratuitously, and where he had a weekly concourse of visitors, when medical topics were made the subject of conversation. This hospital he continued to superintend for about eight years, when he found the labour that it involved was more than he could undertake consistently with his other avocations. In this manner, and from surgical lectures which he delivered in London, Mr Wardrop's reputation became well established. In 1818, he was appointed Surgeon Extraordinary to the Prince Regent; and when the Prince, after his accession to the throne, visited Scotland, Mr

Wardrop attended him. He is understood to have been a great favourite with the king; but, towards the last days of that monarch, a misunderstanding at Court arose which excluded Mr Wardrop from attendance, in consequence, it was thought, of his having complied too frankly with the king's urgent inquiry as to the nature and probable termination of his disease. There can be no doubt that Wardrop was right in the opinion he formed, though whether the communication he made was consistent with the rules of courtly etiquette is not easy to determine. It is, however, believed that, from some of those who had been instrumental in excluding him from the royal death-bed, Mr Wardrop ultimately received an ample apology. Mr Wardrop, though an excellent surgeon in all respects, soon showed a special familiarity with ophthalmic surgery, and attained the highest reputation in that department, both by his writings and his practice. In 1813, Mr Wardrop published the well-known case of James Mitchell, the boy born blind and deaf, who, I believe, only died in the present year. The case excited a great deal of interest both among metaphysicians and physiologists. Mr Wardrop's account of it is extremely interesting and curious. He had partially succeeded in admitting light to the boy's eye by operating for cataract, and the sight was thereby improved, so as to afford the patient the delight that colours could convey, and which he keenly enjoyed, though his vision still remained too imperfect to become a source by which practical information of external objects could be introduced. Mr Wardrop was a man of very varied tastes and talents. He had a great love and appreciation of art. He was very fond of horses, and frequented the hunting-field till a comparatively late age; and it was with great satisfaction that he wrote his essay on the diseases of the eye of that animal, which obtained a prize from the Board of Agriculture. It has been said that he operated with success on several valuable race-horses and hunters by couching them for cataract, to the great gratification of their owners; but whether the animals when so treated required a pair of spectacles or an artificial lens to supply the place of the extirpated humour, I am unable to tell.

I shall not here attempt any account of Mr Wardrop's works, which must be well known to medical men, who are most likely to

feel an interest in the subject. An enumeration of them is given in Pettigrew's "Medical Portrait Gallery," where also the incidents of his life are fully narrated. I believe that he enjoyed a peaceful and cheerful old age, and attained his eighty-seventh year, without much suffering. I have heard that he latterly discontinued the use of wine, and attributed to that circumstance mainly his continued enjoyment of health. He had always been a temperate man, his favourite beverage being tea. Not very long before his death he had the misfortune to lose his wife, who also attained a great age, and latterly his eyesight failed him completely. This he felt as a great privation, but he bore it with patience, and never murmured. He sank into a state of great weakness, which gradually led to his death without any struggle. He was much loved and respected by all who knew him, and his reputation as a good man and as an excellent surgeon, and especially as a distinguished and scientific oculist, ought not soon to be forgotten in his profession.

It is said that he has left behind him a manuscript record of his recollections, which, if published, would in all probability, coming from a man of his ability, observation, humour, and experience, be highly interesting, not only to the profession, but to the public.

The following statement respecting the Members of the Society was read by the Chairman :—

I. Honorary Fellows—

Royal Personage,	1
British subjects,	19
Foreign "	33
Total Honorary Fellows, —	53

II. Non-Resident Member under the Old Laws, 1

III. Ordinary Fellows :—

Ordinary Fellows at November 1868,	289
<i>New Fellows, 1868-69.</i> — Robert Henry Bow, Alexander Buchan, Rev. H. Calderwood, James Dewar, Professor A. Dickson, William Dickson, George Elder, Principal Sir Alexander Grant, Bart., Sir Charles Hartley, Isaac Anderson-Henry, Alexander Howe, Professor Fleeming Jenkin,	—
Carry forward,	289

	Brought forward,	289
Dr John W. Johnston, Maurice Lothian, David MacGibbon, Dr R. Craig MacLagan, Dr W. C. M'Intosh, John Maclare, Dr Henry Marshall, O. G. Miller, John Pender, Rev. T. M. Raven, Dr W. Rutherford, J. L. Douglas Stewart, Viscount Walden, Capt. T. P. White,		26
		315
<i>Deduct Deceased.</i> —Dr Begbie, William Brand, Dr Dalzell, Professor Dyce, Principal Forbes, Rev. Dr Muir, Dr Penney, Dr Seller, James Wardrop,	9	
James Anstruther (formerly noticed),	1	
<i>Resigned.</i> —Dr A. E. Mackay, Bishop Morell,	2	
		12
Total Number of Ordinary Fellows at November 1869,		303
Add Honorary and Non-Resident Fellows,		54
		357

Monday, 20th December 1869.

PROFESSOR KELLAND, Vice-President, in the Chair.

The Keith Prize for the Biennial Period ending May 1869, having been awarded by the Council to Professor P. G. Tait, for his paper "on the Rotation of a Rigid Body about a fixed point," which has been published in the Transactions, the Medal was delivered to him by the President at the commencement of the Meeting.

The following Communications were read:—

1. On the Geological Structure of some Alpine Lake-Basins.
By Archibald Geikie, Esq., F.R.S.

In this paper the author reviewed the arguments by which the geologists of Switzerland endeavour to prove that the so-called "orographic" lakes are essential parts of the architecture of the Alps. He showed from detailed sections of one or two lakes, particularly of the Lake of the Four Cantons, that the amount of denudation, which the surrounding rocks had suffered, demonstrated that

the lakes must be greatly younger than the plication of the strata of the Alpine chain; that from the known effects of subaerial denudation, the lakes must be, in a geological sense, quite modern; and that the Alpine lakes possessed no distinctive features which entitled them to be considered apart from the numerous lakes which are scattered over northern Europe and America. He regarded the enormous development of lakes at the present period in northern latitudes as a fact which could not be explained by reference to subterranean movements. Such movements must have taken place in a late geological period, otherwise the lakes would have been filled up with sediment, as is going on every day. He could not but think that the formation of such lake-basins was connected in some way with the action of the denuding forces, and he believed that the theory proposed by Professor Ramsay—that the rock-basins had been hollowed out by the ice of the glacial period—fulfilled all the geological conditions of the problem, and would eventually come to be accepted even by the geologists of Switzerland.

2. Preliminary Notice of the Great Fin Whale, recently stranded at Longniddry. By Professor Turner.

This communication was preliminary to a more extended memoir which the author hopes to lay before the Society during the Session.

The colour, general form, and dimensions of the animal, were taken when the whale was lying on the shore at Longniddry. The observations on its internal structure were made whilst it was undergoing the operation of flensing at Kirkcaldy, or on specimens which were brought over to the Anatomical Museum of the University. These specimens it was his intention to preserve in the Museum. In conducting the examination he had been ably and willingly seconded by the thoroughly cordial and enthusiastic co-operation of his assistant Mr Stirling, and his pupils Mr Millen Coughtrey, and Mr James Foulis.

Most of the Fin Whales which had been subjected to examination by British and Continental anatomists had been found floating dead on the surface of the sea, and had then been towed ashore; but the Longniddry whale had got entangled, whilst living, amongst

the rocks and shoals, where it was left as the tide receded. The length of the animal, measured from the tip of the lower jaw to the end of the tail, 78 feet 9 inches. The girth of the body immediately behind the flipper was 45 feet. Its girth in line with the anal orifice was 28 feet, whilst around the root of the tail it was only 7 feet 6 inches. The inner surface of the lower jaw, close to its upper and outer border, was concave, and sloped inwards so as to admit the edge of the upper jaw within it. The lower jaw projected at the tip $1\frac{1}{2}$ foot beyond the upper. The length from the angle of the mouth to the tip of the lower jaw, along the upper curved border, was 21 feet 8 inches. The dorsum of the upper jaw was not arched in the antero-posterior direction. It sloped gently upwards and backwards to the blow holes, from which a low but readily recognised median ridge passed forwards on the beak, gradually subsiding some distance behind its tip. On each side of this ridge was a shallow concavity. Immediately in front of the blow holes the ridge bifurcated, and the forks passed backwards, enclosing the nostrils, and then subsided. The outer borders of the upper jaw were not straight, but extended forward from the angle of the mouth for some distance in a gentle curve, and then rapidly converging in front, formed a somewhat pointed tip. Their rounded palatal edge fitted within the arch of the lower jaw. The transverse diameter of the upper jaw over its dorsum, between the angles of the mouth, was 13 feet 3 inches. From the blow holes the outline of the back, curved upwards and backwards, was uniformly smooth and rounded, and for a considerable distance presented no dorsal mesial ridge. From the tip of the lower jaw to the anterior border of the dorsal fin the measurement was 59 feet 3 inches. This fin had a falcate posterior border. Behind the dorsal fin the sides of the animal sloped rapidly downwards to the ventral surface, so that the dorsal and ventral mesial lines were clearly marked, and the sides tapered off to the tail. The ventral surface of the throat, and the sides and ventral surface of the chest and belly, were marked by numerous longitudinal ridges and furrows. When he first saw the animal, the furrows separating the ridges were not more than from $\frac{1}{4}$ to $\frac{3}{4}$ inch broad, whilst the ridges themselves were in many places 4 inches in breadth, but as the body began to swell by the formation of gas

from decomposition, the furrows were opened up, became wider and shallower, and the ridges underwent a corresponding diminution in breadth. At the same time a considerable change took place in the contour of the body in the thoracic and abdominal regions, which presented a huge lateral bulging, giving a greater girth than when it first came ashore.

The flipper, which measured 12 feet 3 inches from root to tip along its anterior convex border, projected from the side of the body 31 feet 4 inches behind the tip of the lower jaw, and 14 feet behind the angle of the mouth. It curved outwards and backwards, terminating in a free pointed end. The distance between the two flippers, measured over the back between the anterior borders of their roots, was 18 feet 6 inches.

On the dorsum of the beak and of the cranium, on the back of the body, and for some distance down its sides, the colour was dark steel grey, amounting in some lights almost to black. On a line with the pectoral flipper the sides were mottled with white, and on the ventral surface irregular, and in some cases large patches of a silvery grey or whitish colour were seen. An experienced whaling seaman, Mr Walter Roddam, who had repeatedly seen this kind of whale in the northern seas, told him that it was known to the whalers by the name of "silver bottom." The dorsal fin was steel grey or black, except near its posterior border, where it was a shade lighter and streaked with black lines. The anterior margin of the lobes of the tail, its upper surface near the root and for the anterior two-thirds, were black, whilst the posterior third of the same surface and the interlobular notch were lighter in tint. The upper surface of the flipper was steel grey, mottled with white at the root, at the tip, along its posterior or internal border, and on the under surface; white patches were seen on the upper surface near the tip, and here they were streaked with black lines running in the long axis of the flipper. White patches also extended from the root of the flipper to the adjacent parts of the sides of the animal. The outside of the lower jaw was black, whilst the inside was streaked with grey. The tongue of the whale was of enormous size. The dorsum was comparatively smooth in front, but at the posterior part it was elevated into hillocks which were separated by deep furrows. The baleen had a deep black colour,

and consisted on each side of plates which projected from the palate into the cavity of the mouth. The plates were arranged in rows—370 were counted on each side—which lay somewhat obliquely across the palate, extending from near the base of the great mesial palatal ridge to the outer edge of the palate. The plates diminished in size so much, that at the tip, where the two sets of baleen became continuous, they were merely stiff bristles. The blubber varied much in thickness. Mr Tait, by whom the whale was purchased, and to whom the author was indebted for the opportunity of examining the animal during the flensing operation, stated that he had obtained from the blubber, and from the inside fat, 19 tons 12 cwt. of oil; whilst the skeleton, including the lower jaw, weighed 9 tons 12 cwt., and the baleen, including the gum, about one ton; the weight of flesh, intestines, and other refuse, was estimated at about 50 tons.

The author believed the whale to be an example of the whale called Steypireyðr by the Icelanders, a description of which by Professor Reinhardt has recently appeared in the Annals of Natural History (Nov. 1868). The Steypireyðr has been identified with the *Balaenoptera Sibbaldii* or *Physalus Sibbaldii* of Gray. The Longniddry whale differed from the *Balaenoptera musculus* (*Physalus antiquorum*, Gray), or common Razor-back, in having a broader and more rounded beak, in the flipper being longer in proportion to the length of the body, in the baleen plates, fringes, and palatal mucous membrane, being deep black, in the plates being longer and broader, in the belly possessing a more silvery grey colour, and in the blubber being thicker, so that the animal is commercially more valuable.

The whale was with calf, but the foetus, a male, had been displaced, and thrown out of the abdominal cavity into a space between the outer surface of the right ribs and the blubber. The displacement had probably occurred whilst she was being towed by the tail across the firth from Longniddry to Kirkcaldy. The whale may have entered the firth in order to give birth to her calf, as there seems reason to think that whales do frequent arms of the sea for that purpose. Although nothing definite seemed to be known of the period of gestation of the Fin whales, yet, from the length of the calf—amounting to nearly 20 feet, or about one fourth the length of the mother—he thought it was probable that

the whale was at or about her full time. Several square feet of the foetal membranes were examined. The outer surface of the chorion was thickly studded with villi, which over large areas had no special mode of arrangement; but in some localities they formed an irregular network, in others they were seated on long ridge-like elevations of the chorion, and in other cases conical folds of that membrane, 5 or 6 inches long, were closely covered with villi. The placenta was diffused, but with a tendency to aggregation of the villi where the chorion was raised into ridge-like and conical folds.

The paper contained an account of the vessels, the pharynx, laryngeal pouch, the omentum, the intervertebral discs, the cylindroform fibrous mass which supports the lower jaw, and a description of the atlas, axis, hyoid bone, sternum and pelvis. The sternum was shown to be not a rudimentary bone, but of considerable size, consisting of three large lobes with a posterior pointed process. The dissection of the foetus proved that the opinion entertained by anatomists, that in the baleen whales the sternum is a single bone developed from one ossific centre, is not correct for all the species. For in this *Balaenoptera* the foetal sternum consisted of two distinct masses of cartilage, one of which corresponded to the posterior pointed process, the other to the larger 3-lobed anterior portion. The pelvic bones were also described. In the foetus they were still cartilaginous, but had the same general form as in the adult, which proved that in the process of ossification no important change took place in their external configuration, and that the pelvis of the male differs in no essential feature from that of the female. From the appearance presented by the skeleton generally, the large whale was obviously in the stage of growth which Mr Flower has termed "adolescent."

The paper was illustrated by photographs, drawings, and specimens.

3. Note on Aggregation in the Dublin Lying-in Hospital. By Dr Matthews Duncan.

In this paper it is pointed out that deliveries are a better means of arriving at an estimate of the healthiness of an hospital than amputations; that the deliveries in the Dublin Hospital are remarkably valuable because of their great number (nearly 200,000),

and of the length of time of the hospital's operation (above 100 years); and that the evidence derivable from them relative to the danger of confinement, as regulated by the amount of aggregation, or number brought together at the same time, has never been properly taken.

It has been asserted by Dr Evory Kennedy and others, that the mortality is in direct proportion to the aggregation. But an analysis of the whole data indisputably shows that in the Dublin Hospital the mortality does not increase with the increased number of the inmates, and does not rise with the aggregation. The mortality of this hospital is neither in the direct nor in the inverse ratio of the aggregation.

The data, indeed, seem to favour the view that the mortality diminishes when the aggregation is increased. Certainly a smaller proportional number die when there were many in the hospital than when there were fewer.

The following Gentlemen were elected Fellows of the Society:—

ST JOHN VINCENT DAY, Esq., C.E.

DAVID MUNN, Esq.

ROBERT R. TATLOCK, Esq.

Monday, 3d January, 1870.

DR CHRISTISON, President, in the Chair.

The following Communications were read:—

1. On a Method of Economising our Currency. By Andrew Coventry, Esq.

In the outset, it was stated that the currency consisted mainly of a large mass of paper, whose convertibility had been provided for by Sir Robert Peel's Bank Bill of 1844-45, with which paper, and the gold set aside for it, the author did not propose to meddle. But alongside of the paper there circulated a large quantity of gold, and the object of his paper was to economise it. Now, gold having only three uses—as currency, in the arts, and to discharge debts abroad—it was desirable that some arrangement should be thought

of which might relieve it of the first mentioned service, in which it suffers much waste, and set it free for the two others.

The plan proposed was to disqualify gold, under legal penalties, for currency or barter within the island, upon which it would flow into the Bank, to be kept there for the security of the notes which would take its place, and for the arts and foreign trade. The gold currency being shown to amount to 80 millions, it was next explained that, agreeably to an article in the "Economist" of 3d July last, the saving thereby effected (in tear and wear, coining and recoining) to the country would be fully L.56,000 a year, or rather L.60,000 a year, as L.4000 might be added for loss by fire and shipwreck. As to the expense, again, of the paper which would be needed to represent the 80 millions of gold brought in by the disqualification, the author proposed to provide for it in the following way:—Let the Bank have to itself two of the 80 millions of gold, and yet be allowed to issue paper to the full amount of 80. The uncovered part of the issue would be a slight extension of the 14 or 15 millions already privileged by statute, and such an extension has been often proposed, and by able men. In return for the two millions of gold, the Bank might very fairly be expected to provide the paper currency and pay the State L.25,700 a year. These figures are arrived at by the terms of the arrangement between the Bank and Government as to the 14 millions being adopted for the two millions now. Farther, a return to the use of small notes in England was recommended, as the experience of Scotland showed that certain improvements in engraving were complete preventives against forgery; and he advocated also gold bars, a suggestion of the late Mr Ricardo, instead of coins.

The result of gain on the whole would be, to the State L.60,000 and L.25,700, besides L.18,000 of profit to the Bank *after* defraying the paper currency—or, in all, L.103,700 a year, which, capitalised, would be three millions.

Such was Mr Coventry's proposal. But he added that some might reasonably be inclined to go further, and to take the whole or part of the remaining eight of the 78 millions, making some compensation to the Bank, of course, seeing that a reserve of 78 of gold against 80 of paper, large at any time, would be extravagant when gold fell to be disused for currency. Even if we were to

assume the cost of 80 millions of paper to be not far short of the cost of maintaining a gold currency of like amount, the scheme proposed would have this merit, that it would bring 80 millions of gold into the bank, of which 70 millions would be an ample reserve against 80 of paper—*thus effecting a gain of Ten Millions.* Mr Coventry showed, too, that bullion was seldom required to be sent abroad to any very great amount by the exchanges, and instanced the year 1864, when the trade of the country amounted to nearly 500 millions, and the balance only to $4\frac{1}{2}$ millions, or a trifle more.

2. On the old River Terraces of the Earn and Teith, viewed in connection with certain Geological Arguments for the Antiquity of Man. By the Rev. Thomas Brown, Edinburgh.

The author described the circumstances which led him, in 1863, to begin the investigation of these terraces, and showed he had traced their course along the Earn from Loch Earn to where they meet the tide. He had also examined the valley of the Teith, and had found the same deposits from the head of Loch Lubnaig to near Stirling. There are three different levels on which the terraces lie at different heights above the river bed. The lowest consists of the present banks of the stream and haughs or meadows; above this there is an intermediate terrace, which, in its turn, is surmounted by the highest. Owing to the effects of denudation, one or other of these levels is frequently interrupted or obstructed, but they are ever again found recurring, and the whole three present themselves so frequently as to show that this threefold terrace system is the true key to these valley deposits. It was shown that they were neither sea-beaches, as some geologists have held, nor lake-margins, as has been maintained by others, but must have been formed by the river itself, at some former age, when its floods had the power of rising to the requisite height. All the three terraces are found varying in height at different points according to the width of the valley, the strength of the current, and other circumstances. The lowest, which consists of the present banks, &c., varies from 3 to 10 feet, according to the locality; the second, from 15 to 24; while the third is from 35 to 60, or

even more above the river bed. Numerous examples were given of their outward form and inward structure to illustrate these views.

The author next proceeded to describe the exact geological position of these deposits. As the time of the kames or escars belonged to the close of the glacial epoch, so the formation of these terraces followed the time of the kames, and they were constructed by river floods out of the pre-existing collections of gravel, &c. The fossil remains of the flora of Strathearn, which they enclose, show that the climate of the period must have been as mild as the present.

Certain geological arguments for the antiquity of man were referred to, especially those deduced from the gravel deposits of the Somme in France and the Brixham cave in England. From the height at which these deposits with flint weapons had been found above the present river courses, it had been held that the human period must be extended so as to leave time for the erosion of the valleys. The author adduced evidence to show conclusively that the Scottish valleys had been eroded down to their present depth previously to the formation of these old gravel deposits, which are found at so great a height above the rivers. If, therefore, the analogy of the Scottish valleys and streams could apply to those of France and England, the time needed for the erosion of the valleys must be thrown out of the account. It was vain to attempt to dissociate the formation of the valley system of France and England from that of Scotland, as if they were not analogous. He had no doubt that these views would be established; but, in the meantime, it was at least right that men should suspend their judgment till the question thus raised had been thoroughly investigated.

The following Gentlemen were elected Fellows of the Society:—

ALEXANDER RUSSEL, Esq.

JAMES CRICTON BROWNE, M.D.

JOHN DUNCAN, M.D., F.R.C.S.E.

W. BURNS THOMSON, F.R.C.S.E.

Dr W. R. SANDERS, Professor of Pathology.

Rev. ANDREW THOMSON, D.D.

JOSEPH LISTER, Professor of Clinical Surgery.

WILLIAM ANDERSON, LL.D.

Monday, 17th January 1870.

GEORGE ROBERTSON, Esq., Councillor, in the Chair.

The following Communications were read:—

1. Experiments on the Colorific Properties of Lichens. By
W. Lauder Lindsay, M.D., F.R.S.E., F.L.S.

The author's paper consists mainly of a *Table* exhibiting certain of the positive results of many hundred experiments on the colouring matters contained in or educible from Lichens. The experiments in question are partly a repetition, and partly an extension on a more systematic and complete scale, of a series of researches made by the author between 1852 and 1855, the results of which were originally submitted to the Botanical Society of Edinburgh. The present series of experiments includes the whole family of the Lichens. The Table represents mainly the effects of chemical reagents on solutions of the lichen colouring-matters, or colorific principles, in boiling alcohol or water. The nomenclature of the Colour-reactions is that of Werner and Syme. As the subjects of his experiments, the author confined himself in great measure to the lichens contained in published *Fasciculi*; so that comparative experiments may hereafter be made on authentic specimens of the *same species* and varieties by other observers in other countries. The author's results are submitted as a mere pioneer contribution to a subject, which has been as yet most imperfectly worked out, viz., the Chemistry of the lichen colouring-matters; but he trusts they may furnish a partial basis for a future more exhaustive series of researches to be undertaken *conjointly by Chemists and Lichenologists*.

The present Table illustrates *pro tanto*—

I. The kinds of colour producible from lichens: those, viz.—

- (a) Which exist ready formed in the thallus—for the most part green, yellow, or brown,—and which are of little practical utility; and
- (b) The colourless colorific principles, which, under the action of ammonia and atmospheric oxygen, yield red or purple

dyes of the class of which Orchil, Cudbear, and Litmus are the familiar types.

- II. The families, genera, or species that possess practical colorific value; as well as the relative values of colorific species or varieties.
- III. The irregularities or uncertainties of colour-development, according to
 - (a) The condition of the lichen operated on;
 - (b) The condition of the reagent; or
 - (c) The circumstances of experiment.

There is thus a rough indication, on the one hand, of the so-called *Dye-lichens*; and, on the other, of species and genera that are practically useless to the colour-maker.

The present series of experiments, moreover, has a direct practical bearing on

- I. The recent introduction of *Colour-tests as Specific Characters in Lichens*;
 - II. The modern manufacture from Lichens (*e.g.*, in France) of *fast dyes*, capable of competing successfully with the brilliant coal-tar colours and other dyes of recent introduction; and
 - III. The use, which still lingers in certain parts of Scotland, and probably also of Wales and Ireland, of lichens as *Domestic dye-stuffs*.
2. On the Principles of Scientific Interpretation in Myths, with Special Reference to Greek Mythology. By Professor Blackie.

Professor Blackie commenced by saying that, of all the branches of interesting and curious learning, there was none which had been so systematically neglected in this country by English scholars as mythology—a subject closely connected both with theology and philosophy, and on which those grand intellectual pioneers and architects, the Germans, had expended a vast amount of profitable and unprofitable labour. The consequence of this neglect was, that of the few British books we had on the subject, the most noticeable were not free from the dear seduction of favourite ideas which possessed the minds of the writers as by a juggling witch-

craft, and prevented them from looking on a rich and various subject with that many-sided sympathy and catholic receptiveness which it required. In fact, some of our most recent writers on this subject have not advanced a single step, in respect of scientific method, beyond Jacob Bryant, unquestionably the most learned and original speculator on mythology of the last century; but whose great work, nevertheless, can only be compared to a grand chase in the dark, with a few bright flashes of discovery, and happy gleams of suggestion by the way. For these reasons, and to make a necessary protest against certain ingenious aberrations of Max Müller, Gladstone, Inman, and Cox in the method of mythological interpretation, he had undertaken to read the present paper; which, if it possessed only the negative virtue of warning people to be sober-minded and cautious when entering on a path of inquiry, full of bogs below and clouds above, could not be deemed impertinent at the present moment.

One great fact as to the origin of Polytheism may be considered as firmly established, and by general consent admitted—viz., that the great physical shows and forces by which man finds himself surrounded and conditioned, assuming, under the influence of reverence and imagination, various anthropomorphic disguises, constituted the original council of the great gods. When we say physical, however, we do not mean physical in the material and mechanical modern sense of the word; but we mean physical in a sort of pantheistic sense, in which nature is regarded as everywhere interpenetrated, inspired, and fashioned by spirit. This being so and ascertained, be it noted, by an overwhelming array of strictly inductive evidence, there can be no difficulty in predicating, *a priori*, what the great gods of the Greeks, to whom I shall confine myself in this paper, must have been originally in their elemental significance. They must have been those powers of Nature and of the human soul, or of Nature considered as animated by a human soul, whose display was most striking, and whose influence was most felt by primeval man. Those powers are—The sky, the earth, the sun, the moon, the stars, the sea and rivers, the atmosphere and winds, the subterranean forces, the underground world, and the unseen powers of darkness beyond the grave, the vegetative or generative principle, the fervid domain of moral emotions,

and the sovereign sway of intellect. For I do not believe in any period when man was merely a brute, or a nondescript creature, half emergent from the primeval man-monkey or monkey-man. Individual tribes of a low type, such as those whom my ingenious, acute, and learned friend, Mr M'Lennan, calls by the undignified name of *Totems*, may always have existed; but in a general Totem-state of an embryo and embruted humanity I do not believe. Hypotheses of this kind are the conceit of speculative science, not historical fact. Starting from this base of operations, our first business is to look our gods fairly in the face, and by a reverential and poetic study of their forms, attitude, dress, badges, and symbols, to recreate the anthropomorphised power in its original elemental significance. And this must be done in an extremely cautious and careful way, so as to make legitimate our inductive conclusions, after the method of which such admirable examples are given by Ottfried Müller in his "Prolegomena"—a small book in respect of bulk, but a truly great book in respect of significance; and to the principles laid down in which it would be well if some of our recent mythological speculators would seriously recur. Mr Ruskin's method of interpreting the Greek gods without such a careful scholarly preparation, is mere brilliant trifling; and all excursions into the realms of comparative mythology and philology, after the fashion of Creuzer and Bryant, without first taking sober counsel from home materials, can result only in floating conjecture, not in stable knowledge. Now, to give an example of what I mean: if we take three of the principal gods of the Hellenic Olympus—Zeus, Poseidon, and Apollo—and peruse them carefully, I defy any man who has a common amount of classical reading, and who, like Wordsworth, can put himself into the position of the original creators of mythology, to form any other conclusion than that these personages are mere anthropomorphic disguises of the heavens, the ocean, and the sun; and towards forming this conclusion, with a man who is entitled to have a judgment on such subjects, not a single shred of Hebrew or Sanscrit, or any foreign organon of interpretation, is required. It may be interesting to know that *Zeus* in its Sanscrit form means *bright* or *shining*; but it is not necessary towards a well-grounded scientific induction of the original significance of the god.

But there are other persons in the Pantheon whose significance is anything but plain ; and in their case, unquestionably, recourse may be had with advantage to etymology, first, in the native language, of course, and then in the kindred languages, in some one of which the original form of the sacred title may have been preserved. A striking example of the utility of native etymology in fixing the significance of the Greek mythological personages is presented in the familiar case of the Harpies, whose whole character and actions, taken along with the open evidence of their Greek names in Hesiod, prove, beyond all doubt, that they are the impersonated forms of such sudden gusts and squalls of wind as come down frequently on the Black Sea or the Highland lochs. But etymology, though a safe guide in such instances, is, in less obvious cases, of all guides the most fallacious. And this is what my distinguished friend Max Müller, and some who follow in his train, seem at the present moment somewhat apt to forget. An etymology, though not caught up in the arbitrary fashion of Bryant and Inman, but traced with the most cautious application of Grimm's laws, is, after all, only a conjecture. It is a conjecture not in the teeth of all philological analogy. It implies a possible, or, as the case may be, a probable identity. But alone, and without extrinsic and real, as opposed to verbal indications, it affords no ground for a legitimate induction. Nothing is more common than accidental coincidences in mythological names—such as the Latin Hercules and the Greek Heracles—which, as scholars know, have not the most remote connection. Besides, even if the true etymology of any Greek god could be found in Sanscrit or any other language, the signification of the original name affords no sure clue to the character of the accomplished god. Our dictionaries are full of words whose ultimate signification has travelled so far away from its original, that the original meaning could supply no key to the modern usage. Πορφύρεος, for instance, means *dark* in Homer, but in Horace *brilliant* or *shining*. Usage alone can inform us of this perversion or inversion of the original meaning of words. But if this be true with regard to mere philology, it is much more true with regard to mythology. The root of a word, like the stock of a tree, may remain stiff enough for centuries; but the human imagination, when employed in the forming of myths, is a kaleido-

scope whose changes are incalculable, and whose results are so transmuted from the original type as to be unrecognisable. On these grounds, I feel myself bound to protest in the strongest manner against the fashion recently introduced by Max Müller and Mr Cox, of giving a new interpretation of Hellenic gods, founded on no firmer basis than slippery Sanscrit etymologies, and a few ingenious conjectures. After reading the distinguished German's lucubrations on Hermes, and Athena, and Erinnys, I stand as unconvinced as before the portentous array of Protean "Radicals," in the first volume of Bryant; it is only another turn of the mythological kaleidoscope from the hand of a man who combines the erudition, the speculation, and the subtlety of his people, with an eloquence and a taste seldom surpassed by the best Englishmen writing their own language in the best way—a man whose character I respect, and whose instructive intercourse I have enjoyed now for a long series of years; but, with regard to whose speculations on curious points of Greek mythology, I can only say, *Amicus Plato sed magis amica veritas.* And etymology is not the only point on which I am forced to dissent from Max Müller and that large school of German thinkers of whom he is the spokesman in this century. A long familiarity with the writings of German scholars has convinced me that there is a particular idiosyncrasy in their minds which, when applied without qualification in mythological research, is peculiarly apt to mislead. This idiosyncrasy leads them to believe in no facts that they are not able to construct from certain favourite presupposed ideas. Now, I believe in facts as having an independent value, and a right to be recognised altogether independent of any favourite ideas which an interpreter of facts may bring to explain them. I believe that one domain of myths is to be explained by ideas; but I believe also in a class of myths, of which the main root and stem are historical, and only the outer limbs and flourishes mythical. I see no presumption whatsoever that the Trojan War represents a conflict between the powers of light and darkness; that Achilles is a degraded solar god, as Müller would indicate, or a water god, as is the fashionable idea of most Germans. The most improbable thing in the world is that a nation should have drawn a brush over all its human memories, and left nothing but myths of the Dawn and the Dark

in the shape of European peers and Asiatic princes. I refuse, therefore, on the faith of a few specious etymologies, to see anything mythical in the main action of the "Iliad;" and I deem it a waste of brain to seek the interpretation of a stout old Thessalian thane, from a Sanscrit epithet of the sun. But India is not the only country to which adventurous scholars have travelled in search of a key to unlock the mysteries of the Hellenic Pantheon. Mr Gladstone, as it is well known, has reverted to the expedient—a favourite one with our old theological giants—of explaining Greek gods through the medium of a primitive sacred tradition. There might be no objection to this if the Hebrews had possessed any original quarry of theologic material from which an Apollo or an Athena could be built up; but the only idea that the Hebrews could have supplied to the Greeks was that of the one Supreme God, whom no doubt we have in Zeus, but unaccompanied with any special Hebrew character by which he might be identified. The same distinguished scholar's most recent excursion into far Eastern lands has not brought back, in my opinion, any more valuable booty. That Aphrodite and Hercules were of Phœnician extraction, at least contained a strong admixture of Phœnician elements, was known long ago; and few facts in early Hellenic history can be considered more certain; but beyond this, all propositions with regard to early Phœnician influence on the persons of the Greek Pantheon, seem to me to stand on too slight a basis of ingenious conjecture to possess any scientific value.

Having made these protests against the brilliant, but, so far as Greece is concerned, in my opinion barren excursions of recent writers into the regions of comparative mythology, I have only to say in conclusion, that the only safe method in the present state of the science of mythology, is to confine our attention to the actual forms and attitudes and symbols of the gods as they present themselves before us in their accomplished impersonation. By tracing Hermes, for instance, to the breeze of the early Dawn, nothing is gained, even it be true; it were only a pretty fancy of the infant Aryan mind on the banks of the Indus, with which a pastoral Greek on Mount Cyllene had nothing to do. The Hermes of the Greeks, is plainly, in the first place, a pastoral god of increase, then a god of gain, when the shepherd became a merchant, and

then generally a god of commerce, and the adroitness which commerce demands. Athena, in the same way, the daughter of the dark-clouded Jove, is the flashing-eyed maiden, because she represents the feminine aspect of the sky, of which her sire represents the masculine. Juno, again, by many manifest signs, is certainly the earth anthropomorphised out of the physical $\gamma\hat{\eta}$, just as $\text{Ze}\hat{\epsilon}\text{s}$ was out of $\text{o}\hat{\nu}\text{pav}\circ\text{s}$. Then, again, if Apollo be the sun, Artemis, his sister, without going further, must be the moon; and Dionysus, the wine god, whose Oriental origin and late introduction is certified, stands by virtue of the phallic symbol manifestly an Oriental god of the generative virtue, just as Hermes was in Arcadia by the same symbol proclaimed the patron of breeding to the sheep-farmers of the Pelasgic peninsula. Then, by the same process of looking at what is before me, apart from German theories and Sanscrit etymologies, I reserve a considerable domain in the mythological land for exaggerated and metamorphic history; not at all concerned that I may be looked on by the winged Germans as a dull, prosaic fellow, or a disciple of the atheistic Euhemerus—for Euhemerus also was not altogether wrong, and the worship of human ideals as, at least, one element in many mythologies, is one of the most accredited facts in the history of the human race. And if I seem to have achieved a very small thing when I keep myself within these bounds, I have at least kept myself clear of nonsense, which in mythological science is as common as sunk rocks in the Shetland seas. To Max Müller, and other Sanscrit scholars, I hope I shall always be grateful for any happy illustrations which they may supply of the general character of Aryan myths, and of occasional coincidences of the Hellenic mode of imagining with the Indian; and I think the somewhat cold and unimaginative race of English scholars are under no small obligations to him for having taught them to recognise poetical significance and religious value in some legends, which passed in their nomenclature for silly fables or worthless facts; but I profess to have been unable to derive any sure clue from the far East to the most difficult questions of Greek mythology; nor do I expect that, when every obsolete word in the Rig Veda shall have been thoroughly sifted and shaken, a single ray of intelligible light will thence flow on the Athena of the Parthenon or the Hermes of the Cyllenian slopes. I believe

that in the region of mythology they will ultimately be found to be the wisest, who are at present content to know the least; that while some mythological fables are too trifling to deserve interpretation, others are too tangled to admit of it; and that the man who, at the present day, shall attempt to interpret the Greek gods from the transliteration of Sanscrit or Hebrew words, will be found, like Ixion, to have embraced a cloud for a goddess, and to have sathered a magnificent lie from the fruitful womb of his own conceit. There is no more dangerous passion than that which an ingenious mind conceives for the fine fancies which it begets.

The following Gentlemen were admitted Fellows of the Society :—

Dr G. H. B. MACLEOD, Professor of Surgery in the University of Glasgow.
Dr THOMAS A. G. BALFOUR, F.R.C.P.E.

The following Gentlemen were admitted Honorary Fellows of the Society :—

1. *Foreign.*

HUGO VON MOHL, M.D., Ph.D., Member of the Imperial Academy Naturae Curiosorum, and Professor of Botany in the University of Tubingen.
CLAUDE BERNARD, Member of the Institute of France, Professor of Physiology in the College of France.

2. *British.*

THOMAS ANDREWS, M.D., F.R.S., M.R.I.A., Vice-President and Professor of Chemistry in Queen's College, Belfast.

